
**Textiles — Tests for colour fastness —
Part A03:
Grey scale for assessing staining**

Textiles — Essais de solidité des coloris —

Partie A03: Échelle de gris pour l'évaluation des dégorgements

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html. (standards.iteh.ai)

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This fifth edition cancels and replaces the fourth edition (ISO 105-A03:1993), which has been technically revised. It also incorporates the Technical Corrigenda ISO 105-A03:1993/Cor.1:1997 and ISO 105-A03:1993/Cor.2:2005. The main changes compared to the previous edition are as follows:

- the use of grey and black sleeves has been allowed;
- a tolerance of ± 2 for the Y tristimulus value has been introduced.

A list of all parts in the ISO 105 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Textiles — Tests for colour fastness —

Part A03: Grey scale for assessing staining

1 Scope

This document describes the grey scale for determining staining of adjacent fabrics in colour fastness tests, and its use. A precise colorimetric specification of the scale is given as a permanent record against which newly prepared working standards and standards that may have changed can be compared.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/CIE 11664-1, *Colorimetry — Part 1: Standard colorimetric observers*

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3 Terms and definitions (standards.iteh.ai)

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Principle

4.1 The essential, or 5-step, scale consists of five pairs of non-glossy grey or white colour chips (or swatches of grey or white cloth), which illustrate the perceived colour differences corresponding to fastness ratings 5, 4, 3, 2 and 1. This essential scale may be augmented by the provision of similar chips or swatches illustrating the perceived colour differences corresponding to the half-step fastness ratings 4-5, 3-4, 2-3 and 1-2, such scales being termed 9-step scales. The first member of each pair is white in colour and the second member of the pair illustrating fastness rating 5 is identical with the first member. The second members of the remaining pairs are increasingly darker in colour so that each pair illustrates increasing contrasts or perceived colour differences which are defined colorimetrically. The full colorimetric specification is given below.

4.2 The chips or swatches shall be white or neutral grey in colour and shall be measured with a spectrophotometer with the specular component included. The colorimetric data shall be calculated using ISO/CIE 11664-1 (CIE 1964) supplementary standard colorimetric system (10° observer data) for illuminant D65.

4.3 The Y tristimulus value of the first member (white) of each pair shall be 85 ± 2 .

4.4 The second member of each pair shall be such that the colour difference between it and the adjacent first member is as follows.

Fastness grade	CIELAB difference	Tolerance
5	0	0,2
(4-5)	2,2	±0,3
4	4,3	±0,3
(3-4)	6,0	±0,4
3	8,5	±0,5
(2-3)	12,0	±0,7
2	16,9	±1,0
(1-2)	24,0	±1,5
1	34,1	±2,0

4.5 **Use of the scale.** Place a piece of the unstained, adjacent fabric (the original piece) and the piece which has been part of a composite specimen in a fastness test (the tested specimen) side by side in the same plane. The surrounding field should be neutral grey colour approximately midway between that illustrating grade 1 and that illustrating grade 2 of the grey scale for assessing change in colour (this is approximately Munsell N5). If necessary, to avoid effects of the backing on the appearance of the textiles, use two or more layers of the unstained undyed textile under both original and treated pieces. Illuminate the surfaces with north sky light in the Northern hemisphere, south sky light in the Southern hemisphere, or an equivalent source with an illumination of 600 lx or more. The light should be incident upon the surfaces at approximately 45° and the direction of viewing approximately perpendicular to the plane of the surfaces. Compare the visual difference between the original piece and the tested specimen with the differences represented by the grey scale for assessing staining.

The colour appearance of samples can be affected by the colour of the surround against which they are viewed and the colour of any material that is used to mask them. In order to obtain reliable test results using this document, the samples shall be masked with a material that is identical in colour to the sleeve that is used to mask the test strip being used. With proper use, neutral grey or black sleeves are acceptable. Proper use entails that, for example, if the test strip is used with a neutral grey sleeve then the samples shall be masked using an identical neutral grey material, or, if the test strip is used with a black sleeve then the samples shall be masked using an identical black material.

If the 5-step scale is used, the degree of staining of the tested specimen is that number of the grey scale which has a perceived colour difference equal in magnitude to the perceived colour difference between the original and the tested specimens; if the latter is judged to be nearer the imaginary contrast lying midway between two adjacent pairs than it is to either, the tested specimen is given an intermediate assessment, for example 4-5 or 2-3. A rating of 5 is given only when there is no perceived difference between the tested specimen and the original piece.

If the 9-step scale is used, the degree of staining of the tested specimen is that number of the grey scale which has a perceived colour difference nearest in magnitude to the perceived colour difference between the original piece and the tested specimen. A rating of 5 is given only when there is no perceived difference between the tested specimen and original piece.

When a number of assessments have been made, it is very useful to compare all the pairs of original and tested specimens which have been given the same numerical rating. This gives a good indication of the consistency of the assessments, since any errors become prominent. Pairs which do not appear to have the same degree of contrast as the remainder of their groups should be re-checked against the grey scale and, if necessary, the rating should be changed.

Bibliography

- [1] ISO 105-A01, *Textiles — Tests for colour fastness — Part A01: General principles of testing*
- [2] ISO 105-J03, *Textiles — Tests for colour fastness — Part J03: Calculation of colour differences*
- [3] ISO 11664-3:2012, (E)/CIE S014-3/E:2011 *Colorimetry Part 3: CIE Tristimulus values*
- [4] ISO 11664-4:2008, *Colorimetry — Part 4: CIE 1976 L*a*b* Colour space*
- [5] CIE S 017, *International lighting vocabulary*

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